

**Notice of Allowability**

Application No.

10/619,383

Examiner

Crystal J. Barnes

Applicant(s)

ZHENDUO ET AL.

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2121

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Amendment received on 11 July 2005.
2. ☒ The allowed claim(s) is/are 1-44.
3. ☐ The drawings filed on \_\_\_\_\_ are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

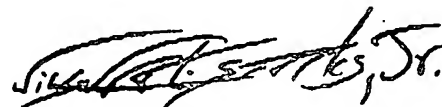
Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☒ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_



**Wilbert L. Starks, Jr.**

**Primary Examiner**

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### DETAILED ACTION

1. The following is a Notice of Allowability in response to the Amendment received on 11 July 2005. Claims 1, 6, 10, 11, 14, 19, 28, 36, 37, 42 and 44 have been amended. Claims 1-44 remain pending in this application.

### REASONS FOR ALLOWANCE

2. Claims 1-44 are allowed.

3. The following is an examiner's statement of reasons for allowance:

As per claim 1, the prior art of record taken alone or in combination fails to teach a second control loop comprising a Model-Based Predictive Controller (MBPC), using a paddle temperature sensor signal as input for the MBPC, which provides as an output a spike temperature control setpoint that is used as input for the conventional controller in the first control loop, the paddle temperature sensor spaced from the heating element and located inside or in proximity to the process chamber, wherein the MBPC is provided with a predictive model representing the behavior of the thermal reactor, the MBPC being configured to calculate an output value based on calculations over a predictive time horizon, using the predictive model.

As per claim 14, the prior art of record taken alone or in combination fails to teach a second control loop comprising a Model-Based Predictive Controller (MBPC), said MBPC configured to provide a control setpoint to said conventional controller, said control setpoint based at least in part on calculations over a predictive time horizon, said MBPC further configured to receive sensor data from at least one second sensor that senses one or more operating parameters of said plant.

As per claim 28, the prior art of record taken alone or in combination fails to teach providing a control setpoint to said first controller, said control setpoint computed by a Model-Based Predictive Controller configured to receive sensor data from at least one second sensor that senses one or more operating parameters of said plant, said Model-Based Predictive Controller further configured to receive a control process sequence for said plants and said Model-Based Predictive Controller configured to calculate said control setpoint based at least in part on calculations over a predictive time horizon.

As per claim 42, the prior art of record taken alone or in combination fails to teach a second control loop comprising a Model-Based Predictive Controller (MBPC), using a second sensor signal as input for the MBPC, which provides an output signal that is used as input for the conventional controller in the first loop,

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the second sensor configured to measure the operating parameter, the second sensor spaced from said actuator and located inside or in proximity to the process chamber, the MBPC configured to calculate the output signal based at least in part on calculations over a predictive time horizon using a predictive model.

As per claim 44, the prior art of record taken alone or in combination fails to teach a Model-Based Predictive Controller configured to compute said control setpoint from at least sensor data from at least one paddle thermocouple sensor and a control process sequence, said control setpoint based at least in part on calculations over a predictive time horizon.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

#### *Drawings*

4. The drawings were received on 11 July 2005. These drawings are acceptable.

5. Figure 4 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

6. Formal drawings are required since this application is in condition for allowance.

#### *Specification*

7. The amendments to the specification were received on 11 July 2005. These corrections are acceptable.

*Conclusion*

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following references are cited to further show the state of the art with respect to model predictive process control in general:

USPN 6,819,347 B2 to Saquib et al.

USPN 6,056,781 to Wassick et al.

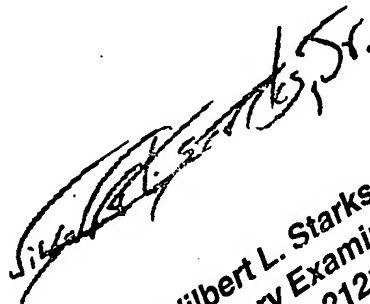
USPN 5,568,378 to Wojsznis

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Crystal J. Barnes whose telephone number is 571.272.3679. The examiner can normally be reached on Monday-Friday alternate Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anthony Knight can be reached on 571.272.3687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CJB  
22 July 2005

A handwritten signature in black ink, appearing to read "Wilbert L. Starks, Jr.", written diagonally across the page.

Wilbert L. Starks, Jr.  
Primary Examiner  
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